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09/943,277	08/30/2001	Ahmad Jalali	PA000054	8791

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Qualcomm Incorporated
Patents Department
5775 Morehouse Drive
San Diego, CA 92121-1714

EXAMINER

TSEGAYE, SABA

ART UNIT PAPER NUMBER

2662

DATE MAILED: 03/09/2004

12

Please find below and/or attached an Office communication concerning this application or proceeding.

PM

Office Action Summary

Application No.

09/943,277

Applicant(s)

JALALI, AHMAD

Examiner

Saba Tsegaye

Art Unit

2662

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11, 13-29 and 31-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-29 and 31-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. Claims 1-4, 7, 16-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghosh et al. ('363) in view of Sadri (US 6,621,808).

Regarding claims 1 and 16, Ghosh discloses, in Fig. 5-9, a method for pre-coding in a communication system, comprising: determining pre-coder parameters (column 2, lines 54-56; column 5, lines 38-52);

pre-coding first data in accordance with the determined pre-coder parameters (column 2, lines 54-56; column 5, lines 38-65);

transmitting (106) the pre-coded first data (column 2, lines 54-67; column 6, line 52-column 7, line 22); and

transmitting (106) non pre-coded first reference data (column 2, lines 58-60; column 9, lines 45-46).

However, Ghosh does not disclose the non-pre-coded first reference data on a common pilot signal, wherein the common pilot signal is sent on a separate channel from the pre-coded first data.

Sadri discloses, in Fig. 2D, an encoder 110, a modulator 111, a MUX 116 and a dedicated pilot channel 114. The Multiplexer multiplexes the pilot signal with the data symbols in a series of data frames (see fig. 1). The dedicated pilot channel is used to signal the mobile station or the base station to reconfigure (column 5, line 40-column 6, line 22).

It would have been obvious to one ordinary skill in the art at the time of the invention was made to use a common pilot signal which is sent on a separate channel, such as that

Art Unit: 2662

suggested by Sadri, in the transmitting of non-pre-coded first reference of Ghosh in order to facilitate re-generation of the carrier in the receiver and allows user carriers to share the common pilot signal for carrier phase reference.

Regarding claim 2, Ghosh discloses the method wherein determining a pre-coder parameters comprises:

receiving (102) a reference data (column 2, lines 54-56; column 6, lines 5-51); and
determining the pre-coder parameters in accordance with the received reference data and the reference data (column 2, lines 60-67; column 6, lines 5-51).

Regarding claim 3, Ghosh discloses the method wherein determining a pre-coder parameters comprises:

receiving the non pre-coded first reference data (column 2, lines 58-67; column 5, lines 5-51);
determining the pre-coder parameters in accordance with the received non pre-coded first reference data and the first reference data (column 2, line 60-column 3, line 28; column 10, lines 14-28); and
transmitting the determined pre-coder parameters (column 2, lines 60-67; column 9, lines 51-58).

Regarding claim 4, Ghosh discloses the method further comprising:

receiving the determined pre-coder parameters (column 5, lines 48-52); and

Art Unit: 2662

providing the determined pre-coder parameters to the pre-coder (column 2, lines 60-67; column 5, lines 5-51) (column 2, lines 60-67; column 5, line 52-column 6, line 5).

Regarding claim 7, Ghosh discloses the method wherein the transmitting a non pre-coded reference data comprises:

transmitting a discontinuous non pre-coded reference data (column 2, lines 58-60).

Regarding claim 17, Ghosh discloses, in Fig. 5, the apparatus, further comprising:

a first receiver (105) communicatively coupled to the pre-coder (106) configured to receive a reference data;

a first processor communicatively coupled to the first receiver(105, 106) (column 7, lines 7-22); and

a storage medium communicatively coupled to the first processor (106) and containing a set of instructions executable by the processor (column 6, lines 19-31) to:

determine the pre-coder parameters in accordance with the received reference data and the reference data (column 2, lines 54-56; column 5, lines 38-52).

Regarding claim 18, the apparatus, further comprising:

a second receiver (102) configured to receive the non pre-coded first reference data (column 2, lines 58-60);

a second processor communicatively coupled to the second receiver (108, 109);

Art Unit: 2662

a storage medium communicatively coupled to the first processor and containing a set of instructions executable by the processor to (column 11, lines 12-17):

determine the pre-coder parameters in accordance with the received non pre-coded first reference data and the non pre-coded first reference data (column 2, lines 60-67; column 6, lines 5-51); and

a second transmitter communicatively coupled to the second processor (103) configured to transmitting the determined pre-coder parameters (column 7, lines 23-48).

Regarding claim 19, the apparatus, wherein the first receiver (105) is further configured to:

receive the determined pre-coder parameters (column 7, lines 7-22); and

provide the received pre-coder parameters to the pre-coder (column 7, lines 7-22).

Regarding claim 21, Ghosh discloses the apparatus wherein the first transmitter is further configured to transmit the non pre-coded first reference data continuously (column 2, lines 58-60).

2. Claims 1, 5, 6, 8, 11, 13-16, 20, 22-26, 29 and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. (11th IEEE workshop on statistical signal processing) in view of Sadri ('431).

Regarding claim 1, Zhou discloses, in Fig. 1, a method for a method for pre-coding in a communication system, comprising: determining pre-coder parameters (page 383, **5. Resolving scalar ambiguities**);

pre-coding first data in accordance with the determined pre-coder parameters (page 383, **5. Resolving scalar ambiguities**);

transmitting the pre-coded first data (page 381-382, **2. system description**); and

transmitting non pre-coded first reference data (page 381-382, **2. system description**).

However, Zhou does not disclose the non-pre-coded first reference data on a common pilot signal, wherein the common pilot signal is sent on a separate channel from the preceded first data.

Sadri discloses, in Fig. 2D, an encoder 110, a modulator 1112, a MUX 116 and a dedicated pilot channel 114. The Multiplexer multiplexes the pilot signal with the data symbols in a series of data frames (see fig. 1). The dedicated pilot channel is used to signal the mobile station or the base station to reconfigure (column 5, line 40-column 6, line 22).

It would have been obvious to one ordinary skill in the art at the time of the invention was made to use a common pilot signal which is sent on a separate channel, such as that suggested by Sadri, in the transmitting of non-pre-coded first reference of Zhou in order to facilitate re-generation of the carrier in the receiver and allows user carriers to share the common pilot signal for carrier phase reference.

Art Unit: 2662

Regarding claims 11, 16 and 29, Zhou discloses, in Fig. 1, a method for demodulating pre-coded data, comprising:

receiving a reference data and a pre-coded data (page 381, **1. introduction**); and
determining demodulator parameters in accordance with the received reference data and the reference data (pages 381-382, **2. system description**); and
demodulating the pre-coded data in accordance with the determined demodulator parameters (pages 381-382, **2. system description**).

However, Zhou does not disclose the non-pre-coded first reference data on a common pilot signal, wherein the common pilot signal is sent on a separate channel from the preceded first data.

Sadri discloses, in Fig. 2D, an encoder 110, a modulator 1112, a MUX 116 and a dedicated pilot channel 114. The Multiplexer multiplexes the pilot signal with the data symbols in a series of data frames (see fig. 1). The dedicated pilot channel is used to signal the mobile station or the base station to reconfigure (column 5, line 40-column 6, line 22).

It would have been obvious to one ordinary skill in the art at the time of the invention was made to use a common pilot signal which is sent on a separate channel, such as that suggested by Sadri, in the transmitting of non-pre-coded first reference of Zhou in order to facilitate re-generation of the carrier in the receiver and allows user carriers to share the common pilot signal for carrier phase reference.

Art Unit: 2662

Regarding claims 8 and 23, Zhou discloses the method wherein the reference data comprise a non pre-coded pilot signal (page 383, **5. Resolving scalar ambiguities**).

Regarding claims 5, 13 and 31, Zhou discloses the method wherein the reference data comprise a pre-coded pilot signal (page 383, **3. Resolving scalar ambiguities**).

Regarding claims 6, 14, 24 and 32, Zhou discloses the method wherein the reference data are continuous reference data (pages 381-383, 1. introduction; **5. Resolving scalar ambiguities**).

Regarding claims 15 and 33, Zhou discloses the method wherein the reference data are discontinuous reference data (page 382; **3. Semi-blind multi-channel estimation**).

Regarding claim 20, Zhou discloses the apparatus wherein the pre-coder is further configured to pre-code a second reference data in accordance with the determined parameters (pages 381-382, **2. system description**); and

wherein the first transmitter is further configured to transmit the pre coded second reference data (pages 381-382, **2. system description**).

Regarding claims 22 and 25, Zhou discloses the apparatus wherein the first transmitter is further configured to transmit the non pre-coded first reference data discontinuously (pages 381-382, **2. system description**).

Art Unit: 2662

Regarding claim 26, Zhou discloses the apparatus wherein the pre-coded second reference data comprise a dedicated pilot data (page 383, **5. Resolving scalar ambiguities**).

3. Claims 11, 29 and 34-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito (EP 1 063784) in view of Sadri ('431).

Saito discloses, in Fig. 5, a transmitter 501, a memory storage unit 504, a transmission rate decision section 503 (claimed a digital signal processor), a pre-coding section, and a transmission section 109 (as in claims 34 and 36); and

a receiver 110, a reception sections 113, a memory 506, and a demodulation section 114 (as in claims 11, 29, 35 and 37).

However, Saito does not disclose the non-pre-coded first reference data on a common pilot signal, wherein the common pilot signal is sent on a separate channel from the preceded first data.

Sadri discloses, in Fig. 2D, an encoder 110, a modulator 1112, a MUX 116 and a dedicated pilot channel 114. The Multiplexer multiplexes the pilot signal with the data symbols in a series of data frames (see fig. 1). The dedicated pilot channel is used to signal the mobile station or the base station to reconfigure (column 5, line 40-column 6, line 22).

It would have been obvious to one ordinary skill in the art at the time of the invention was made to use a common pilot signal which is sent on a separate channel, such as that suggested by Sadri, in the transmitting of non-pre-coded first reference of Saito in order to

Art Unit: 2662

facilitate re-generation of the carrier in the receiver and allows user carriers to share the common pilot signal for carrier phase reference.

4. Claims 9, 10, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghosh in view of Sadri as applied to claim 1 above, and further in view of Chung (US 4,995,057).

Ghosh discloses all the claim limitations as stated above. Further, Ghosh in view of Sadri discloses, in Fig. 7, a forward equalizer 132 and a means for storing a plurality of calculated IRF coefficients corresponding to respective ones of the plurality of transmitter. However, Ghosh in view of Sadri does not expressly disclose a processor communicability coupled to the at least two equalizers.

Chung discloses, in Fig. 3, equalizer 380, 381 and sampler 384 (column 3, lines 13-21; column 6, lines 35-67; column 8, line 64-column 9, line 11).

It would have been obvious to one ordinary skill in the art at the time the invention was made to use more than one equalizer, such as that suggested by Chung, in receiver of Ghosh in view of Sadri in order to optimize the quality of data and to assure the noise at the input to the receiver decoder is both Gaussina and white.

Response to Arguments

5. Applicant's arguments with respect to claims 1-11, 13-29 and 31-37 have been considered but are moot in view of the new ground(s) of rejection.

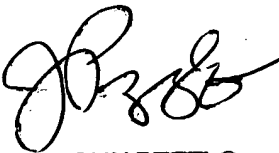
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saba Tsegaye whose telephone number is (703) 308-4754. The examiner can normally be reached on Monday-Friday (7:30-5:00), First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (703) 305-4744. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ST
March 3, 2004


JOHN PEZZLO
PRIMARY EXAMINER